ENGINEERED OPEN READING FRAME FOR P53

Abstract of the Invention

The transcription factor and tumor suppressor protein p53 is inactivated in many human cancers. Approximately forty percent of cancers carry large amounts of mutated full-length p53 protein with one of over 900 reported single amino acid changes in the p53 core domain that recognizes p53 DNA binding sites. The ability to restore function to these inactive p53 proteins would dramatically improve cancer therapy. Alternative open reading frames that are more easily engineered encode a wild-type p53. The alternative open reading frames are optimized for codon usage and expression of p53 proteins in *E. coli*, yeast and mammalian cells. The alternative open reading frames may additionally contain mutations that are naturally found in human cancers, substitutions that correspond to polymorphic p53 alleles, or mutations in residues that can be post-translationally modified.